System for Artificially and Transiently Amplifying the RADAR Cross Section of Drone Aircraft

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Introduction

Although a great deal of effort has gone into developing improved methods for mitigating the RADAR Cross Section of low-observable aircraft, the possibility of amplifying the RCS of an aircraft has not been explored. The exploration of this concept may open the door to convincingly imitating the RCS of other aircraft types and when combined with the mimicking of the flight dynamics of those other aircraft types through artificially intelligent autonomous flight, this concept may help to frustrate efforts to intercept incoming bombers by enemy air defenses through a strategy incorporating the use of bomber decoys as well as disguising fighter-interceptors as commercial aircraft prior to attack runs.

Abstract

A specialized drone formation may be creatively used in order to generate RADAR returns to enemy air defenses which are consistent with larger aircraft such as bombers or commercial aircraft, depending upon the intent, by detecting incoming enemy RADAR emissions and returning active emissions matched to the frequency of the enemy emissions which supplement the returns so as to generate overall feedback to enemy RADARs as closely as possible matched to the expected RADAR profile of a bomber.

Formations of seven drones flying in a tetrahedral formation may be used in order to enable this achievement, even when enemy RADARs illuminate aircraft from many directions and using frequencies which are rapidly rotated.

This may be made possible by using all but the central drone in the tetrahedral formation as forerunning sensors to detect the incoming RADAR emissions and to emit active emissions which would masquerade as reflections from the central drone. These peripheral drones would operate with their plasma envelopes in the "on" condition but the central drone would leave its stealth capabilities switched off when in decoy mode.

The peripheral drones would sense the incoming electromagnetism and would emit electromagnetism timed to match the timing of the return reflection from the central, non-stealthy drone. The peripheral drones would have the benefit of 1/300th of one millionth of one second to decide which frequency to emit and to emit the needed spoofed returns for every two meters of distance between the peripheral drones and the central drone, for obvious reasons. While this would have been challenging a decade ago, modern processors are both sufficiently compact and speedy to achieve this in the compact space near the forward-most

portion of narrow probosces extending from the nose of the peripheral drones, outside of the plasma envelope.

Conclusion

While non-negligible, the comparatively low per-unit cost of such groupings of seven drones relative to the cost of the B-2 and B-21 would justify their use as decoys in high-stakes attack scenarios in which delivery on target must be assured. It may be possible to protect these decoys and ensure their safe return home given that this spoofing may be terminated just prior to the anticipated shootdown of the decoys and that the central drone could simply re-activate its plasma envelope at the appropriate time. Given that the aircraft being imitated have small RCS in the first place, the amplitude of the spoofed emissions need not be great in order to mimic the appearance of a stealthy yet detectable aircraft such as the B-2.